AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

IN THE CLAIMS:

1-23. (cancelled)

24. (previously presented) A method for producing a porous carbon article comprising the steps of:

selecting powders of at least one carbide of an element selected from the group consisting of Group III, IV, V and VI of Mendeleyv's Periodic System, the at least one carbide having physical and chemical constants to obtain a porous carbon article having a desired nanoporosity by calculating using the relationship:

$X = Z*(1-R)/R$

where X = specified size of desired nanopores and $X \leq 10$ nm;

$Z = 0.65-0.75$ nm;

$R = \nu M_c=\rho_k/M_k\rho_c$

where

M_c - molecular mass of carbon, g/mole;

M_k - molecular mass of the selected carbide, g/mole;

ρ_k - density of the selected carbide, g/ccm;

ρ_c - density of carbon, g/ccm;

ν - number of carbon atoms in carbide molecule;

forming an intermediate body with transport pores

having a size larger than 100 nm by shaping the selected powders;

heat treating the intermediate body in a medium of gaseous hydrocarbon or hydrocarbon mixtures at a temperature exceeding the decomposition temperature for the hydrocarbon or hydrocarbons until the mass of the intermediate body has increased at least 3% thereby producing a work piece in the form of a rigid carbonaceous skeleton; and

thereafter thermochemically treating the work piece in a medium of a gaseous halogen to produce the porous carbon article having nanopores of a size X.

25. (previously presented) The method according to claim 24, wherein the carbide powders are chosen in dependence of desired distribution of nanopores by sizes using the relationship:

$$\Psi_i = {}_{Ki}\varphi_i/\Sigma K_i\varphi_i$$

where Ψ_i - volumetric part of nanopores with size x_i in total volume of nanopores;

φ_i - volumetric part of i-th carbide in particle mixture;

n - number of carbides;

$$K_i = 1 - \nu M_c\rho_{ki}/M_{ki}\rho_c$$

where M_c - molecular mass of carbon, g/mole;

M_{ki} - molecular mass of i-th carbide, g/mole;

ρ_{ki} - density of i-th carbide, g/ccm;

ρ_c - density of carbon, g/ccm;

N - number of carbon atoms in carbide molecule.

26. (previously presented) The method according to claim 24, wherein the intermediate body has a porosity of 30-70 vol%.

27. (previously presented) A method for producing a porous carbon article comprising the steps of:

selecting powders of at least one carbide of an element selected from the group consisting of Group III, IV, V and VI of Mendeleyv's Periodic System, the at least one carbide having physical and chemical constants to obtain a porous carbon article having a desired nanoporosity by calculating using the relationship:

$$X = Z*(1-R)/R$$

where X = specified size of desired nanopores and $X \leq 10$ nm, nm;

Z = 0.65-0.75 nm;

$$R = \nu M_c = \rho_k / M_k \rho_c$$

where

M_c - molecular mass of carbon, g/mole;

M_k - molecular mass of the selected carbide, g/mole;

ρ_k - density of the selected carbide, g/ccm;

ρ_c - density of carbon, g/ccm;

ν - number of carbon atoms in carbide molecule;

forming an intermediate body with transport pores having a size larger than 100 nm by shaping the selected powders;

heat treating the intermediate body in a medium of gaseous hydrocarbon or hydrocarbon mixtures at a temperature

exceeding the decomposition temperature for the hydrocarbon or hydrocarbons until the mass of the intermediate body has increased at least 3% thereby producing a workpiece in the form of a rigid carbonaceous skeleton; and

thereafter thermochemically treating the work piece in a medium of a gaseous halogen to produce the porous carbon article having nanopores of a size X, and

wherein the intermediate body has a porosity determined with the following relationship:

$$\varepsilon_0 = (1 - \nu_{np}/\Sigma K_i \varphi_i) * 100$$

ε_0 porosity of intermediate body vol%;

where

φ_i - volumetric part of i-th carbide in particle mixture;

ν_{np} - predetermined volumetric part of nanopores in final article;

$$K_i = 1 - \nu M_c \rho_{ki}/M_{ki}\rho_c$$

where

M_c - molecular mass of carbon, g/mole;

M_{ki} - molecular mass of i-th carbide, g/mole;

ρ_{ki} - density of i-th carbide, g/ccm;

ρ_c - density of carbon, g/ccm;

ν - number of carbon atoms in carbide molecule.

28. (previously presented) The method according to claim 24, wherein the treatment in a medium of gaseous hydrocarbon or hydrocarbon mixtures is carried out until the mass

of the intermediate body has changed according to the following relationship:

$$\Delta m = Q(\varepsilon_0 - V_{tr})/(1 - \varepsilon_0)$$

where

Δm - relative change of intermediate body mass, g/g;

ε_0 - porosity of intermediate body, vol%;

V_{tr} - predetermined volumetric content of transport pores, vol%;

$$Q = \rho_c/\rho_{mix}$$

where

ρ_c = density of carbon, g/ccm;

ρ_{mix} = density of carbides mixture, g/ccm.

29. (previously presented) The method according to claim 24, wherein the intermediate body is formed by pressing.

30. (previously presented) The method according to claim 24, wherein the intermediate body is formed by slip casting, tape casting or slurry casting.

31. (previously presented) The method according to claim 24, wherein the mixture of hydrocarbons comprises a natural gas.

32. (previously presented) The method according to claim 31, wherein the treating in hydrocarbon medium is carried out at 750-950°C.

33. (previously presented) The method according to claim 24, wherein at least one of the hydrocarbons used during the treatment of the intermediate body in hydrocarbons medium is

selected from the group consisting of acetylene, methane, ethane, propane, pentane, hexane, benzene and their derivatives.

34. (previously presented) The method according to claim 33, wherein the treating in hydrocarbon medium is carried out at 550-1200°C.

35. (previously presented) The method according to claim 24, wherein the particles of carbide or carbides of which the intermediate body is formed are arranged uniformly throughout its volume.

36. (previously presented) The method according to claim 24, wherein the particles of carbide or carbides of which the intermediate body is formed are arranged non-uniformly throughout its volume.

37. (previously presented) The method according to claim 24, wherein the gaseous halogen comprises chlorine.

38. (previously presented) The method according to claim 24, wherein the thermochemical treatment of the workpiece is carried out at 350-1200°C.

39. (previously presented) The method according to claim 38, wherein the thermochemical treatment is carried out at 500-1100°C.

40. (previously presented) The method according to claim 26, wherein the intermediate body has a porosity of 35-50 vol%.